Representation of Black Voters in the Electoral College

I.   **Introduction**

Voting and representation rank as two of the most crucial elements of democracy, yet attempts to stifle Black voices and votes haunt the history of the United States. Voters determine leaders and leaders dictate policy, so silencing voters has severe consequences for representation. Although the days of outright voter suppression through mechanisms such as the Grandfather Clause and literacy tests have passed, Donald Trump's popular vote loss and Electoral College victory in 2016 illustrated that some voters still carry more power than others. The distribution of voters across states determines whose votes carry the most electoral weight, and concentrations of various demographic groups vary across states. Given the nation's history of voter suppression and the heterogeneity of state-level populations, the Electoral College could very well perpetuate the underrepresentation of historically marginalized groups. This raises the question, does the Electoral College offer proportional representation for Black voters? This analysis finds that the Electoral College underrepresents Black voters on a nationwide scale. However, Black voters do not receive over or underrepresentation in the states that decide the election.[1]

This essay first draws from literature to contextualize the importance of proportional representation of Black voters in the Electoral College. Then, this paper takes a two-pronged approach to develop hypotheses for the research question. The first approach--referred to as the "National Approach"--examines whether Black voters achieve nationwide proportional representation in terms of electoral votes per capita. The second approach--the "Battleground Approach"--investigates the proportion of Black voters in battleground states relative to the nation as a whole. After reviewing related literature and proposing two hypotheses, the following

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[1] The code, data, and report for this analysis are available on GitHub at https://github.com/kayla-manning/black-representation-ec

two sections outline a unique quantitative method to assess each hypothesis with election data and state-level Census data: the National Approach utilizes linear regression and the Battleground Approach uses a paired t-test. After assessing the limitations of each method, the paper tests the hypotheses using their respective methods. Finally, the paper concludes with a discussion of the results, their implications, and paths for future research.

II.   Literature Review & Proposed Hypotheses

Motivation: Why does proportional representation in voting matter?

When discussing the representation of Black voters in the Electoral College, this analysis takes an aggregative view of substantive representation, which focuses on the representation of group interests in proportion to the numbers of that group (Mansbridge, 1999). Proportional representation in voting has implications for both substantive representation in policy and descriptive representation in elected officials. Previous research found that African American voters are more likely to cast ballots for losing candidates in local, state, and federal elections across the United States (Hajnal, 2009). Assuming that Black voters support candidates that best represent their descriptive and substantive interests, consistent election losses would hinder the representation of their interests. The previously described study examines the Black vote in the context of election results, but it does not consider the weight of the Black vote in determining those outcomes. This analysis aims to fill that gap. Previous research on congressional districts found that dividing minority voters equally across districts generally maximizes substantive representation (Cameron et al., 1996). This finding solidifies the connection between minority voters and substantive representation. If ballots cast by Black voters in the presidential election have less weight than ballots cast by non-Black voters, then underrepresentation in voting would also have downstream consequences on Black voters' substantive representation--and possibly

descriptive representation--in the presidency. Considering the nation's long history of voter suppression and poor representation of Black Americans, the continued misrepresentation of Black voters through the Electoral College would exacerbate the historical patterns of underrepresentation. These compounding effects highlight the importance of assessing whether or not the Electoral College offers proportional representation for Black voters, both nationwide and within the battleground states.

National Approach: Electoral Votes Per Capita

The first approach to assess the research question compares the electoral votes per capita for all Black voters to the electoral votes per capita of non-Black voters. Examining electoral votes per capita gauges if all voters have an equal voice, as they would in a national popular vote. Previous work has explored the relationship between electoral votes per capita and a state's population of White voters in presidential elections from 2000 to 2020. The study found that the Electoral College consistently awarded more votes per capita to states with Whiter populations and more racially conservative attitudes (Blake, 2019). The previous research focused on White versus non-White voters, but not all non-White individuals are Black. Due to the unique struggle of Black voters throughout American history, this analysis will focus on Black voters relative to non-Black voters.

By the nature of proportions, an increased proportion of White adults in a state implies a decreased proportion of non-White adults. Since states with larger White populations tend to award more electoral votes per capita, it follows that states with larger non-White populations tend to award fewer electoral votes per capita. This gives reason to contend that, as a whole, the Electoral College system underrepresents Black voters.

Hypothesis 1: *The average Black voter in the United States receives fewer electoral votes per capita than the average non-Black voter, implying that the Electoral College underrepresents Black voters on a national level.*

Battleground Approach: Black Proportion of the Voting-Age Population

Much narrower in scope than the National Approach, the Battleground Approach will focus on the winner-take-all nature of the Electoral College and its emphasis on battleground states. The winner-take-all system incentivizes candidates to strive for rail-thin margins across a wide range of states rather than seek out landslide victories in the most populous states. As a result, candidates often devote a disproportionate amount of attention to "battleground" states in an attempt to win over just enough voters. Since these states often determine election winners, a larger proportion of Black voters in battleground states relative to non-battleground states would imply that Black voters have a disproportionately powerful voice in deciding the election outcome.

To construct a hypothesis about the proportional representation of Black voters in battleground states, one should consider the variables of race and partisanship. Since Black voters tend to vote for Democratic candidates (Blake, 2019), a consistent Republican electoral edge in key states could provide grounds to hypothesize that the population distribution disadvantages Black voters. However, a previous study found that the spatial distribution of voters did *not* systemically advantage either party in the presidential elections from 1948-2000 (Gelman, Katz, & King, 2004). This study does not include the five most recent presidential elections, but recent work confirms that the electoral edge has continued to alternate between parties since the turn of the century (Skelley, 2021).

Of course, not all Black voters vote for Democrats, which makes partisanship an imprecise gauge for the distribution of Black voters across key states. Fortunately, overall population demographics seem to reinforce the notion that the distribution of voters across states does not disadvantage Black voters. If anything, a larger-than-average Black composition of the voting-age population in battleground states could lead to overrepresentation of Black voters in key states relative to the nation as a whole. While many rural states with a high number of electoral votes per capita tend to have overwhelmingly White populations, many of the recurring battleground states have a relatively large black population (U.S. Census Bureau, 2011). In fact, more than one-third of Black eligible voters reside in 2020 battleground states (Budiman, 2020).

Paired with the lack of a systemic partisan advantage in the Electoral College, the Black population share in battleground states lends itself to the hypothesis that Black voters have disproportionately high representation in the states that matter most.

Hypothesis 2: Black voters comprise a larger share of the voting-age population in battleground states relative to non-battleground states, implying that battleground states give Black voters a disproportionately large weight in the Electoral College.

III. Methods

A. Method I: National Approach

The first method to assess the representation of Black voters in the Electoral College uses linear regression to map a state's electoral votes per million voters from each state's natural log of the Black percentage of the voting-age population.[2] This quantitative method operationalizes representation in the Electoral College by determining if ballots cast in states with a higher share of Black voters carry less electoral weight relative to ballots from other states. An inverse

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[2] See Appendix A1 for an explanation of the use of the natural log-transformed variable rather than the raw value.

relationship between the percentage of Black voters and electoral votes per million voters would provide evidence that Black voters face underrepresentation in the Electoral College system. In practice, I use a separate regression for each year to account for changes in population and electoral vote distribution. Within each regression, individual states served as the units of analysis.[3]

Ideally, this analysis would draw from data on the state-level Black versus non-Black turnout in each election. To obtain this data, I would purchase voter files with information on every voter across all elections of interest. Then, using a mixture of variables such as name, the demographic breakdown of the voter's Census tract, and voting history, I could impute the race for each of approximately 180 million voters in each election year. Even then, classification errors would introduce some inaccuracy in the data. This approach, while doable, demands much more labor and money than warranted by the scope of this assignment.

Instead, this analysis uses state-level estimates of the voting-age population (VAP) by race and ethnicity, made available by the Census Bureau and compiled by IPUMS USA (Ruggles et al., 2021). Because the Census only tracked decennial estimates until 2000, I used linear interpolation[4] to estimate the total VAP and Black VAP counts for each non-Census year before the turn of the century. Using these estimates, I calculated the Black proportion of the VAP for each of these years. Then, I replaced the interpolated total VAP counts for years from 1980-2014 with the state-level total VAP data from the United States Elections Project (McDonald, n.d.). Unfortunately, the data from the United States Elections Project did not have the racial breakdown of the state-level VAP, so I rescaled the Black VAP estimates by applying the Black

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[3] To get a sense of the overarching trend rather than looking at each state in isolation, Table 3 in Appendix A3 includes additional regressions that incorporate fixed effects for the election year or state and election year.

[4] The `na.approx()` R function in the `zoo` package performed the linear interpolation.

proportions from the interpolated data to the official VAP data. In conjunction with this

population data, I used data with electoral vote counts to calculate each state's electoral votes per

million (Office of the Federal Register, 2019).

B. Method II: Battleground Approach

An alternative approach to the research question takes advantage of the *battleground*

states resulting from the winner-take-all system and tests if Black voters comprise a greater share

of the electorate in these crucial states. To begin this analysis, I treat all battleground states in a

given year as a single unit and all of the non-battleground states within that same year as a single

unit. Then, I sum the Black VAP and overall VAP across the states in each group and take the

Black proportion of the VAP for the two categories within that election year. Summing all of the

populations together within each category yields proportions weighted by population size.

Because the Electoral College assigns more votes to states with larger populations, a weighted

proportion of the Black VAP best suits this analysis of Black representation in the Electoral

College. While the Battleground Method does not directly account for electoral votes, the

relative state-level population sizes serve as a proxy for electoral power. After aggregating the

data for the two categories, I perform a paired t-test to assess my hypothesis that battleground

states have a greater Black proportion of the VAP than non-battleground states.

Ideally, this paper would draw from some universal definition of "battleground state," but

this clear-cut definition does not exist beyond the general idea that battleground states are closely

divided states that play a crucial role in determining the election's outcome. For this analysis, I

define a "battleground state" as any state with a two-party vote margin within 5% points for that

election.[5] State-level election return data determines each state's battleground status for each

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[5] See Appendix B2 for sensitivity analyses that run the same test while varying the cutoff for a "battleground state."

election (MIT Election Data and Science Lab, 2021). As discussed in the previous section, the ideal voter data source would contain demographic information on the voters that cast ballots in each of the elections of interest. Due to the inaccessibility of this data, this paper instead uses Census estimates and data from the United States Elections Project to estimate the state-level racial breakdown of the voting-age population (Ruggles et al., 2021 & McDonald, n.d.).

IV.   Limitations

A. Data: limited timeframe and missing election years

The state-level election data only dates back to 1976 and the demographic Census data only covers until 2019, so this analysis will focus on the presidential races from 1976 to 2016. Before 2000, the government only collected population data from the decennial Census and did not have the American Community Survey estimates. As described in Methods A, I used linear interpolation to fill in the gaps for non-Census years between 1970 and 2000 and then cross-referenced with data on the state-level total VAP for years 1980-2014 (McDonald, n.d.). This assumes perfect linear population change in the Black population for each decade, which is an unlikely assumption. However, the direction and magnitude of the change will likely parallel that of reality. Additionally, the National Approach looks at each year in isolation, so slightly different numbers in these interpolated years will not have any bearing on the coefficients for other elections. Because no ideal data source exists, I chose to move forward with this approach.

B. External Validity: not generalizable to other elections

This analysis will not attempt to make a causal argument: any conclusion about the overrepresentation or underrepresentation of Black voters in the Electoral College owes itself to some other connection between race and the electoral geography of the time. Since this analysis does not seek to identify a causal mechanism, the results cannot generalize far beyond the

examined elections. Even within this analysis, variables change between elections. Both approaches must account for shifting population distributions, and the Battleground Approach must also account for changes in battleground state classification. To provide a more nuanced look at the relationship between Black voters and Electoral College representation, the National Approach examines each election separately. Likewise, the Battleground Approach uses a paired t-test to look at the differences between battleground and non-battleground states for the same election before assessing the significance across all of these differences. Since population redistribution happens gradually and electoral vote reallocation only occurs every decade, the conclusions within this analysis do not vary significantly between elections. Likewise, trends in representation will likely not vary in the elections immediately preceding and proceeding the time frame covered in this analysis. If the results of this analysis all lean in the same direction, one could speculate that the trend may continue in the time surrounding the studied timeframe. However, I cannot and will not use these results to speculate about the future nor the pre-Jim Crow past of Black voter representation in the Electoral College.

V. Results

A. National Approach

As discussed in Methods A, an inverse relationship between electoral votes per million and a state's Black VAP would provide evidence that Black voters face underrepresentation in the Electoral College system. Plotting the data reveals a negative association between the two variables, and a linear regression confirms the significance of the inverse relationship.

Electoral votes per million decrease as the logged
Black percentage of the VAP increases
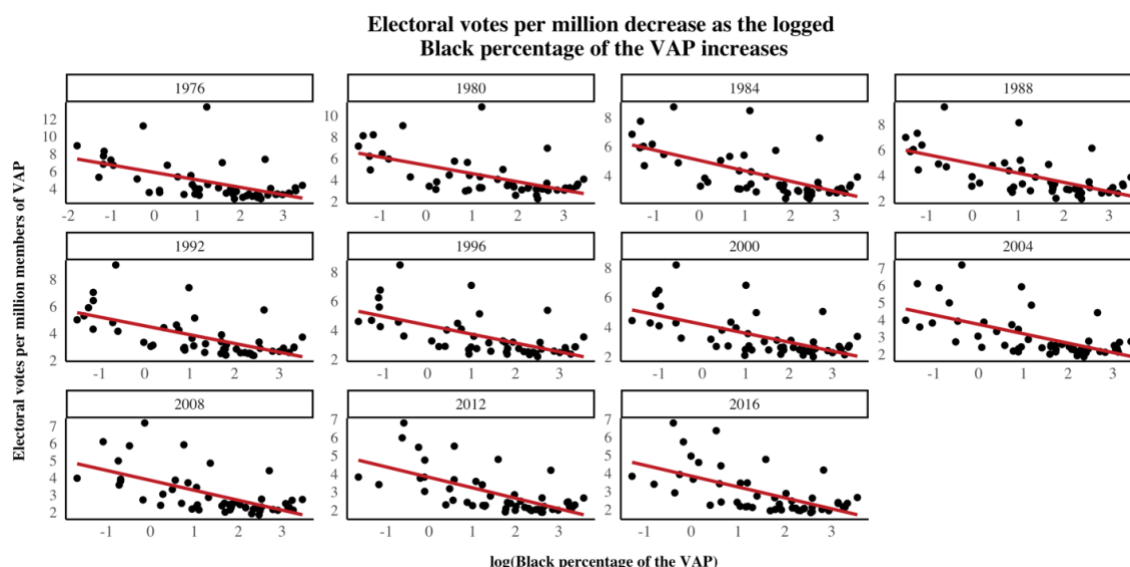
Every election has a negative coefficient for the Black VAP term, indicating that an increase in the Black share of the VAP typically accompanies a decrease in the electoral votes per million members of the VAP in that state. This pattern holds for the years with the actual Census counts and those that relied on linear interpolation. On average, a 1% increase in the Black percentage of the VAP is associated with a decrease of anywhere from 0.005 to 0.008 electoral votes per million members of the VAP.[6] These changes seem small, but the numbers for the overall electoral votes per million are rather small as well, with Florida having only 1.82 electoral votes per million in the 2016 race. These results confirm Hypothesis 1 and provide sufficient evidence to conclude that Black voters face underrepresentation in the Electoral College on a national scale.

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[6] Note that the regression uses the log of the independent variable, so this interpretation differs from the direct interpretation of the coefficient. This does not mean an increase of one percentage point, but rather an increase of 1% from the previous number (so an increase of 0.2 percentage points if the baseline value is 20%). See Appendix A1 for further explanation of log transformations.

Table 1: National Approach

	Dependent variable:										
	Electoral votes per million										
	1976	1980	1984	1988	1992	1996	2000	2004	2008	2012	2016
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
log(Black percentage of VAP)	-0.854***	-0.768***	-0.716***	-0.723***	-0.651***	-0.612***	-0.598***	-0.545***	-0.576***	-0.574***	-0.604***
	(0.187)	(0.150)	(0.124)	(0.124)	(0.116)	(0.112)	(0.110)	(0.104)	(0.107)	(0.100)	(0.115)
Constant	5.864***	5.363***	5.054***	4.902***	4.550***	4.329***	4.177***	3.729***	3.846***	3.800***	3.841***
	(0.364)	(0.296)	(0.241)	(0.239)	(0.225)	(0.219)	(0.218)	(0.193)	(0.205)	(0.201)	(0.226)
Observations	50	50	50	50	50	50	50	50	50	50	50
R^2	0.302	0.354	0.411	0.413	0.394	0.384	0.383	0.365	0.377	0.405	0.364
Adjusted R^2	0.288	0.341	0.399	0.401	0.381	0.371	0.370	0.351	0.364	0.393	0.351

*p**p***p<0.01

B. Battleground Approach

If a larger proportion of Black voters live in battleground states relative to non-battleground states, then Black voters would have a disproportionately large weight in the states that determine election outcomes. The paired t-test, as described in Methods B, reveals an insignificant difference between the Black share of the VAP in battleground states and non-battleground states. When aggregated across the years, the estimated difference in the Black share of the VAP in battleground states versus non-battleground states is less than one percent, and the p-value of 0.668 indicates that this slight difference could have easily arisen due to chance. Therefore, the data do not support the conclusion that Black voters are significantly overrepresented in battleground states relative to non-battleground states.

Paired t-test for difference in the Black percentage of the VAP

Alternative hypothesis	Greater
Estimated difference	-0.562
p-value	0.668
Degrees of freedom	10
Test statistic	-0.449

This result does not come as a surprise since states that qualify as battleground states vary between elections, and each of these states has a different Black share of the VAP. Appendix B1 displays a table with the yearly differences between battleground and non-battleground Black share of the VAP, and the differences show no clear pattern across election years. Since the t-test takes the paired differences and aggregates them across all elections, the positive and negative differences balance out at an insignificant, near-zero value.

VI.   Conclusion

The results of this analysis are twofold. First, a linear regression confirmed the first hypothesis that states with larger Black percentages of the VAP receive fewer electoral votes per million. Second, a paired t-test found no sufficient evidence supporting the second hypothesis that battleground states give a disproportionately large weight to Black voters. When viewing these results in conjunction, this analysis found that Black voters do not have an advantage or disadvantage in battleground states, but the Electoral College underrepresents Black voters in the aggregate. As previously described, underrepresentation in voting has downstream consequences on the substantive--and possibly descriptive--representation of voters. This raises the question, whose voices deserve amplification in presidential elections? The Electoral College prevents smaller, more urban states from crowding out the larger but less populous states. However, one must also consider how the findings of this analysis suggest that the Electoral College subtly

perpetuates the suppression of the voices of Black Americans. Should the Electoral College amplify the voices of rural voters at the expense of Black voters? Future research could explore the different implications of aggregative underrepresentation for various subsets of the population.

Assuming that underrepresentation of any group has negative consequences for that group, then one might consider how to optimize representation for all. Switching from the Electoral College system to a national popular vote would achieve perfect aggregative representation of voters in an election. Unfortunately, the current political climate makes any drastic Electoral College reform unlikely, and scholars disagree about the best path forward. The most direct path to abolishing the Electoral College would require a constitutional amendment, but one party typically benefits from the Electoral College and is unlikely to back such a move. The National Popular Vote Plan, a movement created in the aftermath of the 2000 presidential election, seeks to bypass the amendment process via state statute. However, scholars criticize the plan's potential to dilute the voices of minority voters and instead argue in favor of an amendment (Gringer, 2008). A clear and feasible solution for the underrepresentation of Black voters does not exist in the current body of academic and political work. Therefore, this analysis also paves the way for future research on realistic paths to improve the aggregative representation of voters.

VII. **Appendix**

    A. National Approach

        1. Using the natural log of the Black percentage of the population

Log-transforming a variable helps to linearize a relationship, reduce the spread of residuals, and normalize its distribution. The Black percentage of the voting-age population is highly skewed, so I took the natural log of the variable before running the regressions. Because proportions have an upper bound of 1 and are negative after taking the natural log, I used the Black percentage of the VAP instead of the proportion of the VAP. This transformation helped to reduce skewness in the distribution of the Black percentage of the VAP and create a distribution more suitable for linear regression.

Taking the natural log of the Black percentage of the voting-age population normalizes the distribution

Taking the natural log of the Black percentage of the VAP linearizes the relationship
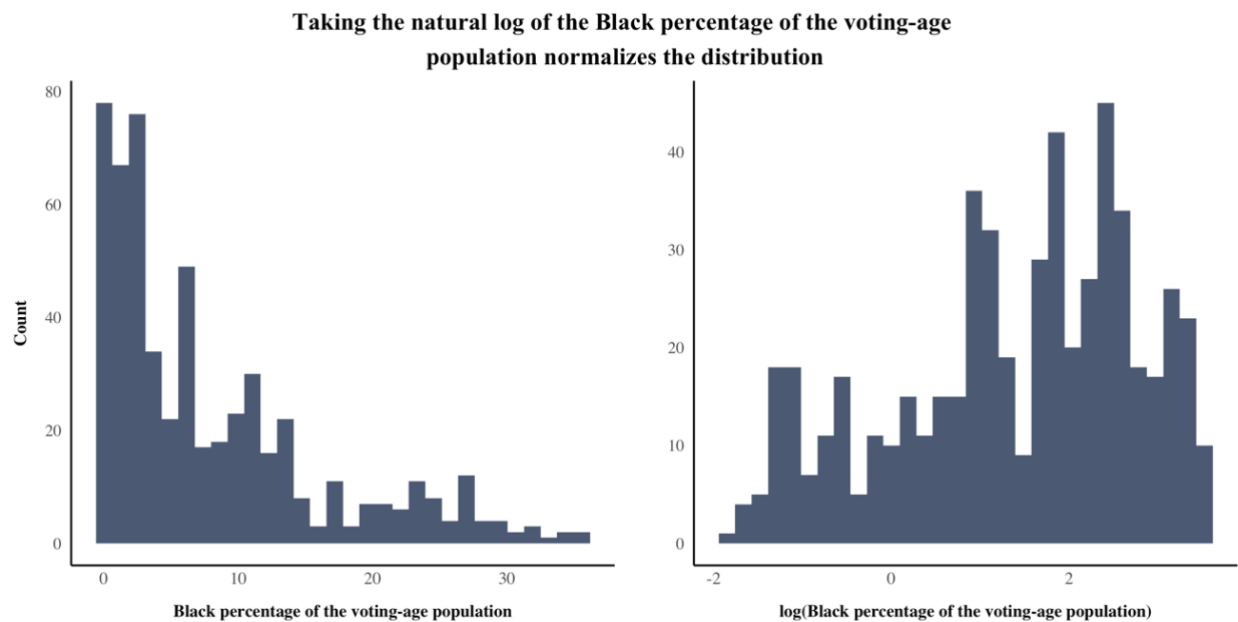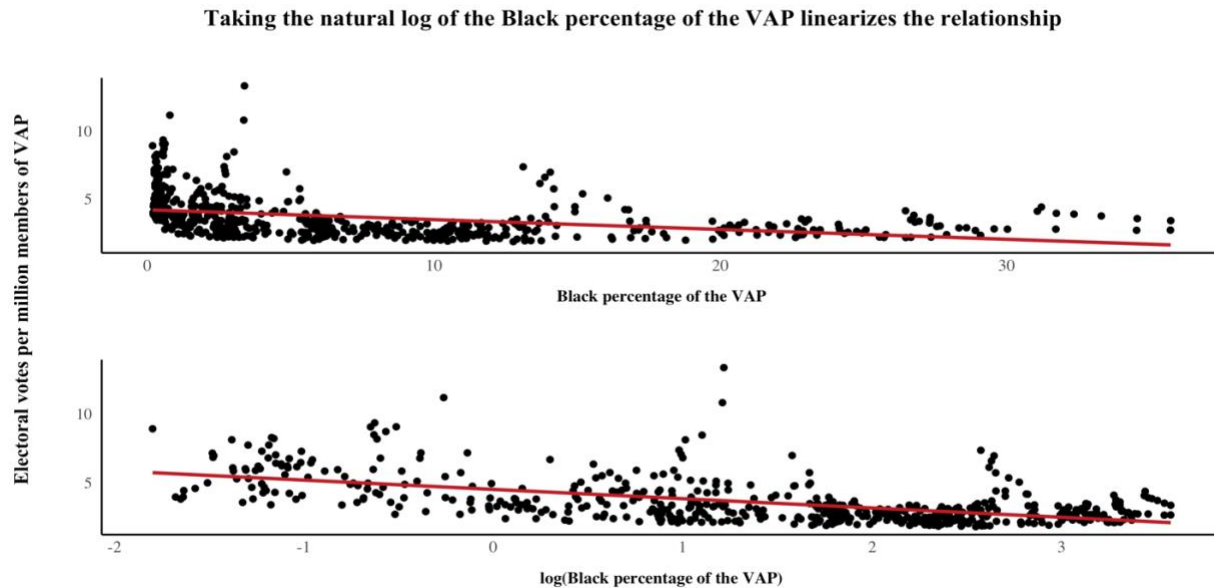
The units of interpretation change when interpreting logged coefficients in linear regression, so the coefficients in the National Approach are interpreted in terms of percent changes rather than single-unit changes (University of Virginia, n.d.).

2. Robust regression to account for heteroscedasticity

Simple linear regression assumes homoscedasticity, or the constant variance of the errors, in the data (Nau, n.d.). A simple plot of the electoral votes per capita reveals that a select few states have far more electoral votes per million voters than the majority of states. These unusually high values pull the regression line higher, skewing the line away from the overall trend in the majority of states. Taking the log of the independent variable helped to remove some of the heteroscedasticity in the data. Because of this previous adjustment, I opted to include this robust regression in the appendix rather than the main analysis. Borrowing from Blake (2019), I also ran a MM regression--a robust regression method resistant to samples with a high proportion of outliers--to account for influential points that may skew the regular OLS regression. Running both of these regressions provides a more nuanced view of the relationship between electoral

votes per million and the Black percentage of the voting-age population. This more robust

regression yields slightly weaker coefficients but does not change the conclusion: on a national

level, the average Black voter has significantly less electoral weight than the average non-Black

voter.

Table 2: National Approach with Robust Regression

	Dependent variable:										
	Electoral votes per million										
	1976	1980	1984	1988	1992	1996	2000	2004	2008	2012	2016
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
log(Black percentage of VAP)	-0.772***	-0.615*	-0.662***	-0.651***	-0.518***	-0.452***	-0.419***	-0.332***	-0.356***	-0.341***	-0.375***
	(0.253)	(0.308)	(0.112)	(0.112)	(0.130)	(0.114)	(0.113)	(0.073)	(0.073)	(0.063)	(0.106)
Constant	5.289***	4.768***	4.688***	4.555***	4.054***	3.771***	3.584***	3.093***	3.179***	3.103***	3.138***
	(0.577)	(0.714)	(0.272)	(0.254)	(0.316)	(0.282)	(0.295)	(0.174)	(0.179)	(0.179)	(0.311)
Observations	50	50	50	50	50	50	50	50	50	50	50
R^2	0.546	0.495	0.583	0.537	0.530	0.509	0.484	0.466	0.484	0.454	0.402
Adjusted R^2	0.537	0.484	0.574	0.528	0.520	0.498	0.474	0.455	0.473	0.443	0.389

*p**p***p<0.01

3. Election year as fixed effects

The main analysis looks at each election year in isolation. However, an alternative

approach would look at the general trend over time, controlling for years. To do that, I ran two

additional regressions that included fixed effects for either the year or the year and the state. The

first regression results in the same conclusion: states with larger percentages of Black voters

have fewer electoral votes per million, resulting in the underrepresentation of Black voters in the

Electoral College. However, one must interpret these coefficients with caution. Population

growth in general will lead to fewer electoral votes per million across all states, hence the

significant negative coefficient for the year. The second regression, which includes fixed effects

for the state, has an insignificant coefficient for the Black percentage of the VAP, indicating that

an increased Black percent of the VAP is not associated with a decrease in electoral power

within the same state. A significant coefficient in this regression would provide evidence for a

causal argument, but Limitations B clearly states that this paper does not seek to make a causal

claim. Within a single state, having an increased Black share of the voting-age population does

not cause the electoral votes per million to decrease. Rather, as previously stated, the underlying

relationship has to do with the states themselves rather than a change in the Black share of the

VAP. Any relationship between Black voters and the Electoral College has to do with the

distribution of Black voters across states.

Table 3: National Approach with Fixed Effects for State and Year

	Dependent variable:	
	Electoral votes per million	
	(1)	(2)
log(Black percentage of VAP)	-0.657***	0.184
	(0.038)	(0.120)
Year	-0.043***	-0.047***
	(0.004)	(0.002)
Constant	89.559***	100.618***
	(8.180)	(3.272)
Year fixed effects	Yes	Yes

	No	Yes
State fixed effects	No	Yes
Observations	550	550
R^2	0.438	0.926
Adjusted R^2	0.436	0.919

*p**p***p<0.01

B. Battleground Approach

1. Displaying the yearly differences in percentages

The output from a paired t-test in R only prints the average difference of -0.562 and does not show the difference within each pair. The below table displays the difference in percentages for each year. This table uses the definition of a battleground state as a state with a two-party vote margin within 5% points. Each year has a very small difference in the Black percentage, and the sign changes approximately every two years. This closer look at the data further bolsters the conclusion of no clear over or underrepresentation of Black voters within battleground states.

Differences in the Black percentage of the VAP

Year	Battleground (%)	Non-battleground (%)	Difference (%)
1976	8.415	11.113	-2.698
1980	13.433	9.129	4.304
1984	2.488	10.261	-7.772
1988	6.980	10.645	-3.665
1992	12.038	8.417	3.622
1996	12.479	9.599	2.880
2000	8.235	11.299	-3.064
2004	5.225	9.778	-4.553
2008	10.899	9.364	1.535
2012	14.727	10.169	4.558
2016	9.259	10.591	-1.333

2. Testing different battleground definitions

Varying definitions of "battleground" could yield different results. The main analysis classified any state with a two-party popular vote margin of less than 5% as a battleground state. To make this analysis as transparent as possible, I ran multiple tests with different definitions of "battleground" to examine how that impacts the results. Below we see that setting larger margins as the classification cutoff yields smaller p-values and more positive differences. However, the p-value never drops to a 0.05 significance level. The closest result to a significant outcome comes at the 30% threshold, but no battleground state reasonably has an election with a 30-point margin. This analysis reveals that while battleground states do generally have larger Black shares of the VAP than non-battleground states, the difference is not significant enough to conclude that battleground states grant overrepresentation to Black voters.

Battleground Sensitivity Analysis

Battleground Cut-off	Difference in the Black VAP percentage (%)	p-value
1	-0.721	0.619
5	-0.562	0.668
10	0.392	0.357
20	0.904	0.226
30	3.418	0.060

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